

HAND AND PORTABLE POWERED TOOLS

- General Safety Precautions
- Hand Tools
- Power Tool Precautions
- Electric Tools
- Powered Abrasive Wheel Tools
- Pneumatic Tools
- Powder-Actuated Tools
- Hydraulic Power Tools
- Jacks.

Introduction



- Tools are such a common part of our lives that it is difficult to remember that they may pose hazards.
- Serious accidents often occur before steps are taken to identify and avoid or eliminate tool-related hazards.
- Workers must learn to recognize the hazards associated with the different types of tools and take the safety precautions necessary to prevent those hazards.

Objectives

- At the end of this Hand and Portable Powered Tools module, you should be able to:
 - Identify the hazards associated with hand and portable powered tools
 - Identify the specific precautions that should be taken with each type of hand and portable powered tools
 - Identify the general safety precautions.

General Safety Precautions



- Employees using hand tools must be provided with the personal protective equipment necessary to protect them from the hazards of falling, flying, abrasive, and splashing objects, and from harmful dusts, fumes, mists, vapors, or gases.

General Safety Precautions



- All hazards involved in the use of tools can be prevented by following five basic safety rules:
 - Keep all tools in good condition with regular maintenance
 - Use the right tool for the job
 - Examine each tool for damage before use
 - Operate according to the manufacturer's instructions
 - Provide and use the proper protective equipment.
- Employees and employers have a responsibility to work together to establish safe working procedures.
- If a hazardous situation is encountered, it should be brought to the attention of the proper individual immediately.

Hand Tools



- Hand tools are non-powered. They include anything from axes to wrenches. The greatest hazards posed by hand tools result from misuse and improper maintenance. Click on the term for examples
 - Examples of Misuse or Improper Maintenance
- The employer is responsible for the safe condition of hand tools and equipment used by employees, but the employees have the responsibility for properly using and maintaining tools.
- Employers also should caution employees to direct saw blades, knives, or other tools away from aisle areas and other employees working in close proximity.
- Knives and scissors must be sharp. Dull tools can be more hazardous than sharp ones.

Hand Tools



- Appropriate personal protective equipment, such as safety goggles, gloves, etc., should be worn to protect against hazards that may be encountered while using portable power tools and hand tools.
- Safety requires that floors be kept as clean and dry as possible to prevent accidental slips with or around dangerous hand tools.
- Sparks produced by iron and steel hand tools can be a dangerous ignition source around flammable substances. Spark-resistant tools made from brass, plastic, aluminum, or wood will eliminate this possible source of ignition.

Power Tool Precautions



- Employees must be trained in the use of all tools - including power tools.
- They should understand the potential hazards as well as the safety precautions to prevent those hazards from occurring.
- Power tools can be dangerous when improperly used. The power source of a tool will give some clues as to the safety precautions required.
- Power tools are classified by their power source:
 - Electric
 - Pneumatic
 - Liquid fuel
 - Hydraulic
 - Powder-actuated.

Power Tool Precautions

- When using power tools, the general precautions listed below should be observed:
 - Never carry a tool by the cord or hose
 - Never yank the cord or the hose to disconnect it from the receptacle
 - Keep cords and hoses away from heat, oil, and sharp edges
 - Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits, or cutters
 - All observers should be kept at a safe distance away from the work area
 - Secure work with clamps or a vise, freeing both hands to operate the tool

Power Tool Precautions

- Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool
- Tools should be maintained with care. They should be kept sharp and clean for the best performance.
- Follow instructions in the user's manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance
- The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts
- All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use."

Power Tool Precautions

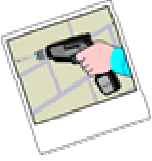


- There are two different kinds of safety devices that are used with portable power tools.
- Click on each term to learn more about these safety devices.
 - Safety Switches
 - Guards

Quiz Question:

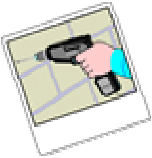
- The greatest hazards posed by hand tools result from misuse and improper maintenance.
 - True
 - False

Electric Tools



- Employees using electric tools must be aware of several dangers.
- The most serious is the possibility of electrocution.
- Other hazards include burns and slight shocks which can lead to injuries or even heart failure.
- Under certain conditions, even a small amount of current can result in fibrillation of the heart and eventual death.
- A shock also can cause the user to fall off a ladder or other elevated work surface.

Electric Tools



- To protect the user from shock, tools must be either grounded with a three-wire cord, double insulated, or powered by a low-voltage isolation transformer.
- Click on the appropriate term to learn more about three-wire cords or double insulation.
 - Three-Wire Cords
 - Double Insulation

Electric Tools



- The general safety practices listed below should be followed when using electric tools:
 - Electric tools should be operated within their design limitations
 - Gloves and safety footwear are recommended during use of electric tools
 - When not in use, tools should be stored in a dry place
 - Electric tools should not be used in damp or wet locations
 - Work areas should be well lighted.

Powered Abrasive Wheel Tools



- Powered abrasive grinding, cutting, polishing, and wire buffing wheels create special safety problems because they may throw off flying fragments.
- Before an abrasive wheel is mounted, it should be inspected closely and sound or ring-tested to be sure that it is free from cracks or defects.
- When conducting a sound test, tap the wheel gently with a light non-metallic instrument

Powered Abrasive Wheel Tools



- A sound and undamaged wheel will give a clear metallic tone or "ring." If it sounds cracked or dead, the wheel could fly apart during use. Therefore, it must not be used.
- To prevent the wheel from cracking, the user should be sure it fits freely on the spindle.
- The spindle nut must be tightened enough to hold the wheel in place, without distorting the flange.
- Follow the manufacturer's recommendations. Care must be taken to assure that the spindle wheel will not exceed the abrasive wheel specifications.

Powered Abrasive Wheel Tools



- Due to the possibility of a wheel disintegrating (exploding) during start-up, the employee should never stand directly in front of the wheel as it accelerates to full operating speed.
- Portable grinding tools need to be equipped with safety guards to protect workers not only from the moving wheel surface, but also from flying fragments in case of breakage.
- When using a powered grinder:
 - Always use eye protection
 - Always turn off the power when not in use
 - Never clamp a hand-held grinder in a vise.

Pneumatic Tools

- Pneumatic tools are tools powered by compressed air and include chippers, drills, hammers, and sanders. There are several dangers encountered with the use of pneumatic tools. The main danger is getting hit by one of the tool's attachments or by a fastener the worker is using with the tool.
- Eye protection is required and face protection is recommended for employees working with pneumatic tools. Noise is another hazard. Working with noisy tools such as jackhammers requires proper, effective use of hearing protection.
- When using pneumatic tools, employees must check to see that they are fastened securely to the hose to prevent them from becoming disconnected. A short wire or positive locking device attaching the air hose to the tool will serve as an added safeguard.
- A safety clip or retainer must be installed to prevent attachments from being unintentionally shot from the barrel. Screens must be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- Compressed air guns should never be pointed toward anyone. Users should never "dead-end" compressed air guns against themselves or anyone else.

Powder-Actuated Tools



- Powder-actuated tools operate like a loaded gun and should be treated with the same respect and precautions.
- In fact, they are so dangerous that they must be operated only by specially trained employees.
- Suitable eye and face protection are essential when using a powder-actuated tool. In addition, the tool should not be loaded unless it is to be used immediately.

Powder-Actuated Tools



- A loaded tool should not be left unattended, especially in areas where unauthorized persons could handle it.
- Some general procedures concerning safe use are identified below.
 - Inspection
 - Firing
 - Misfires
 - Defects

Powder-Actuated Tools



- The muzzle end of the tool must have a protective shield or guard centered perpendicularly on the barrel to confine any flying fragments or particles that might otherwise create a hazard when the tool is fired.
- The tool must be designed so that it will not fire unless the protective shield is present.
- All powder-actuated tools must be designed for varying powder charges so that the user can select a powder level necessary to do the work without excessive force.
- Finally, powder-actuated tools can be used to apply fasteners. Click on the term below to learn about some special considerations.
 - Fasteners

Hydraulic Power Tools



- A hydraulic tool is a tool operated or effected by the action of water or other fluid of low viscosity.
- The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed.
- The manufacturer's recommended safe operating pressure must not be exceeded for:
 - Hoses
 - Valves
 - Pipes
 - Filters
 - Other fittings.

Jacks



- A jack is a portable device for lifting heavy loads through a short distance.
- All jacks (lever and ratchet jacks, screw jacks, and hydraulic jacks) must have a device that stops them from jacking up too high.
- Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack. The load limit should never be exceeded.
- A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up.

[Jacks]



- Jackstands or suitable blocking should be used to support the load.
- Dairy or cola crates should not be used to support a load.
- Use wooden blocking under the base if necessary to make the jack level and secure.
- If the lift surface is metal, place a 1-inch-thick hardwood block or equivalent between it and the metal jack head to reduce the danger of slippage

[Jacks]

- When setting up a jack, make certain that the:
 - Base rests on a firm level surface
 - Jack is correctly centered
 - Jack head bears against a level surface
 - Lift force is applied evenly.
- Proper maintenance of jacks is essential for safety. All jacks must be inspected before each use and lubricated regularly.
- If a jack is subjected to an abnormal load or shock, it should be thoroughly examined to make sure it has not been damaged.
- Hydraulic jacks exposed to freezing temperatures must be filled with an adequate antifreeze liquid.

[Quiz Question:]

- Powering equipment with a low-voltage isolation transformer is one method of protecting the user from shock.
 - True
 - False

[Quiz Question:]

- Which of the following are often used to ensure that power abrasive wheels are safe to operate?
 - X-rays
 - Sound tests
 - Speed calibration tests
 - Visual inspections

[Quiz Question:]

- Pneumatic tools are operated or effected by the action of water or other fluid of low viscosity.
 - True
 - False

[Summary]

- In this module we discussed:
- General Safety Precautions
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